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Filed:	6/27/01	Docket No.:	975.340USW1
Title:	A METHOD FOR GENERATION AND TRANSMISSION OF MESSAGES IN A MOBILE TELECOMMUNICATION NETWORK		

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Michael B. Lasky
Name

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Box
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Washington, D.C. 20231

Dear Sir:

Enclosed is a certified copy of EP application, Serial Number PCT/EP98/08513, filed 30 December 1998, the priority of which is claimed under 35 U.S.C. §119.

Respectfully submitted,

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Date: November 23, 2001 By:

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The attached documents are exact copies of the international patent application described on the following page, as originally filed.

Les documents fixés à cette attestation sont conformes à la version initialement déposée de la demande de brevet international spécifiée à la page suivante.

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Der Präsident des Europäischen Patentamts
Im Auftrag
For the President of the European Patent Office
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NATHALIE KUIPER

Patentanmeldung Nr.
Patent application no. PCT/EP 98/08513
Demande de brevet n°

Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

Anmeldung Nr.:
Application no.:
Demande n°: PCT/EP 98/08513

Anmelder:
Applicant(s):
Demandeur(s): 1. NOKIA TELECOMMUNICATIONS OY - Nokia Group, FINLAND
2. KARLSTEDT Paul - Espoo, FINLAND

Bezeichnung der Erfindung:
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Titre de l'invention: A METHOD FOR GENERATION AND TRANSMISSION OF MESSAGES IN A MOBILE TELECOMMUNICATION NETWORK

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Feld Nr. V BESTIMMUNG VON STAATEN

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A METHOD FOR GENERATION AND TRANSMISSION OF MESSAGES IN A MOBILE TELECOMMUNICATION NETWORK

FIELD OF THE INVENTION

The present invention concerns a method for generation and transmission of messages in a mobile telecommunication network, in which network communication is for example effected according to the GSM standard.

BACKGROUND OF THE INVENTION

In recent years, mobile telecommunication networks have widely spread and the number of subscribers thereto is still continuously increasing.

Such mobile telecommunication networks are operated according to a common standard of communication, like for example the GSM standard. As regards the network architecture, such networks generally consist of a mobile access network of base transceiver stations covering a given area also known as cells, and a mobile switching network. A mobile subscriber terminal or mobile station MS, respectively, roaming within the network is able to establish a communication link with another mobile station within the network or with a subscriber to the public switched telecommunication network (hereinafter PSTN network) via an interface between the mobile network and the PSTN network.

With the continuously increasing number of subscribers to the mobile telecommunication network, the traffic load for the network is correspondingly increasing. In particular, it can be observed that there exist peak traffic load values in the network at specific times.

For example, in the evening (rush hour), when the majority of people finish work and are on the way home, people having a mobile phone, i.e. subscribers to the mobile telecommunication network, increasingly tend to make use of their mobile phone. This increases the traffic load in the network during those evening rush hours.

Among such mobile phone calls, there may be calls during which people make an appointment for the evening, call different friends, or the like. However, there are also a large number of such calls, which are established day by day with the same subscriber counterpart (e.g. at the PSTN network side) and which may have substantially the same contents each day. For example, a husband returning home from work in the evening will give his wife at home a phone call every day informing her that she may prepare dinner. Such a call has substantially invariably the same content each day, like for example "I'm on my way home darling. Please prepare the diner."

Apparently, this practice of the mobile subscribers creates a substantial peak load in the mobile access network at specific times of the day. In order to satisfy all subscribers, the operator of the mobile network would have to provide for additional traffic capacity of the network,

which would lead to increasing costs for operating the network and in turn to an increase in the costs for the subscribers.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method for generation and transmission of messages in a mobile telecommunication network which reduces the peak traffic load in the mobile access network.

This object is achieved by a method for generation and transmission of messages in a mobile telecommunication network, comprising the steps of monitoring the location of a mobile subscriber terminal within cells constituting the mobile telecommunications network, comparing the monitored location with a predetermined group of cells, judging, whether the monitored location corresponds to said predetermined group of cells, and if the result of judging is positive, generating and sending a message from said network.

Advantageous further developments of the present invention are defined in the dependent claims.

Accordingly, by automatically initiating a generation and transmission of a message from a mobile network dependent on the location of a mobile subscriber terminal, the peak traffic load for the mobile access network at specific times can be reduced. Namely, it can safely be assumed that the mobile subscribers move in different directions for

different distances, and consequently require different times until they are close to a respective predetermined location like for example their proper home. Thus, transmissions of messages which - without the present invention being implemented - were effected at substantially the same time, according to the present invention, are now established at different times, when the respective subscriber terminal reaches a respective predetermined location (group of cells) within the network. This leads to a distribution of the peak traffic load occurring in the mobile network over a certain period of time, thereby reducing and/or averaging the traffic load.

Accordingly, no additional traffic capacities for the mobile network need to be provided for in order to cope with such peak traffic loads.

Furthermore, the proposed method enables the user of the mobile phone that he has not to remember to initiate the phone call on his own motion, thereby increasing the comfort for the user. In particular, when the user is driving his car, this also contributes to an increased security in road traffic.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is described hereinafter in greater detail with reference to the drawings, in which:

Fig. 1 schematically shows a mobile telecommunication network with mobile subscriber terminals moving for example towards the subscribers' home places; and

Fig. 2 represents a flow chart explaining the method according to the present invention.

DETAILD DESCRIPTION OF EMBODIMENTS OF THE INVENTION

Fig. 1 shows schematically a mobile telecommunication network NW with two mobile subscriber terminals MS1, MS2 moving towards the respective subscriber's home place SH1, SH2. The mobile telecommunication network NW is illustrated as a network which consists of a plurality of cells C0, C1, ..., C9,..., Cn. Each cell corresponds to a respective base station BS (not shown) present in the subject cell and is defined by the radio coverage area of the base station. In the illustrated situation, both mobile subscriber terminals MS1, MS2 of respective subscribers to the mobile telecommunication network NW are currently present in cell number C5 and (as indicated by the arrows) are moving in direction of the respective subscriber's home SH1, SH2. The subscribers homes are illustrated as being located in cell number C3, C7, respectively. The subscribers homes are each assumed to have a terminal of the public switched telephone network SH1:PSTN, SH2:PSTN.

Thus, in case both subscribers finish work at substantially the same time and their respective offices are assumed to be both located in cell number C5, without the present

invention being implemented, both subscribers would initiate a call at substantially the same time.

However, with the present invention being implemented, such a call is initiated automatically upon judging that the respective subscriber MS1, MS2 has reached a group of cells comprising for example at least cells C0, C2, C3, C4, C8 (and some others "further on the left (not shown)), and comprising at least C7, C8, C9 (and some others "further surrounding C7 on the left, bottom and right (not shown)), respectively, which are close to his home.

Hence, assuming that e.g. in rush hours all subscribers can move only with substantially the same velocity, the time of initiating the respective call (and/or message transmission) is determined by the time, at which the respective subscriber reaches the group of cells in which his home is located. This, in turn, depends on the respective distance of the subscriber's home to his office.

In the illustrated example, the distance between MS1 in cell C5 to the group of cells (C0, C2,C3, C4,...) in which SH1 is located can be expressed as "one cell", whereas the distance between MS2 in C5 to the group of cells (C7, C8, C9,...) in which SH2 is located can be expressed as "two cells". Consequently, a call and/or message transmission from the network to SH2:PSTN will be initiated after a message transmission from the network to SH1:PSTN has been initiated, and the transmission of respective messages takes place at different times.

Thus, the initiation of the respective calls does no longer take place at substantially the same time, so that the peak traffic amount is reduced. Stated in other words, the overall traffic amount is distributed over time, dependent on the location of a respective mobile subscriber terminal.

The situation depicted in Fig. 1 has, for purposes of explanatory simplification, been limited to two subscribers only and assumed that calls would be initiated by both subscribers at "substantially the same time" (without the invention being implemented). In connection with two subscribers only, this assumption is rather "blue-eyed" as regards its practical occurrence. However, in practice, a large number of several hundreds or even thousands of subscribers is present within the cell, and from a statistical evaluation of all the subscribers' behavior, it can safely be assumed that numerous calls are established at "substantially the same time" within the network, so that the above simplified description is well applicable for explaining the principle of the present invention.

Fig. 2 shows a flow chart explaining the method according to the present invention in greater detail in terms of the respective processing steps performed.

The present invention is implemented as a subscriber service or value added service, respectively. The method is initiated upon its activation in step S0. Subsequently, the location of a subject mobile subscriber terminal MS1, MS2 for which the method is activated, is monitored in step S1. In a following step S2, the monitored location of the

subject mobile station MS is compared with a predetermined group of cells, corresponding to (e.g. surrounding) a predetermined location like for example the subscriber's home. Then, in a step S3, it is judged whether the monitored location corresponds to (i.e. is within) the predetermined group of cells. Stated in other words, it is judged whether a subject mobile station MS1, MS2 has reached the correspondingly predetermined group of cells, in which group of cells for example the respective subscriber's home SH1, SH2 is located.

If the result of judgment is negative (NO in step S3), the process loops back to step S1 and monitoring the location of the respective mobile station MS in the network NW is continued.

If, however, the result of judgment is positive (YES in step S3), the process proceeds to step S4. In step S4, the generation and sending and/or transmission of a message from the network is instructed. Then a (predetermined) message is generated and transmitted by the network (i.e. by a network element like for example a network controller) for the respective mobile station MS1, MS2 to a predetermined terminal present within the respective predetermined group of cells, like for example the respective subscriber's PSTN telephone terminal SH1:PSTN, SH2:PSTN at his respective home place.

After transmission of the message, the flow reaches step S5 and the process is terminated.

In the foregoing example, the description has focused on an example, in which said predetermined group of cells comprises those cells of the network NW, which surround the cell in which there is the home of the subscriber SH1/SH2, and the cell in which there is the home of the subscriber SH1/SH2, to which subscriber the mobile MS1/MS2 and said predetermined SH1:PSTN/SH2:PSTN subscriber terminals are assigned.

However, the method may be adapted so that any group of cells of the network may be chosen as the predetermined group of cells, and the message may be transmitted to any predetermined subscriber within the predetermined group of cells. For example, a message may be transmitted to the subscriber's fitness center to inform a receptionist of his soon arrival.

Furthermore, the transmitted predetermined message may be a predetermined voice message like for example one for informing one's wife to prepare dinner.

Nevertheless, according to a modification of the present invention, the method may be adapted such that the transmitted predetermined message is a data message. In such a case, the data message may contain control data for remotely controlling equipment assigned to the predetermined subscriber terminal to which the message is transmitted. For example, the data message may contain control data for controlling the heating/air condition or sauna, alarm systems, the opening of the garage etc. at the subscriber's home. In a further modification, the data

message may contain instructions for a transmission of data monitored at equipment assigned to said predetermined subscriber terminal, to said mobile subscriber terminal. Such monitored data to be transmitted to said mobile station MS may, for example, be the temperature in the subscriber's home or some other data.

In particular, the monitoring of the location of a mobile subscriber terminal within the network can easily be effected by repeatedly retrieving data corresponding to the location of said mobile subscriber terminal MS, from a home location register in which a record of the location of each subscriber terminal present within the range of the associated mobile services switching center is kept.

Moreover, it is conceivable that a mobile subscriber is frequently moving during a day and for example frequently crosses/enters the above mentioned predetermined group of cells. In order to prevent that in such situations the predetermined message is generated and transmitted frequently by the network without actual necessity therefor, the method may be adapted to enable the generation and transmission of said predetermined message only, if additionally a predetermined time condition is met. This means that the message is generated and transmitted only, if the mobile station is present within the predetermined group of cells during a predetermined time range, like for example the evening rush hour. In such a modification, step S3 in Fig. 2 would have to be modified accordingly in that also such a timing condition is checked.

It should be understood that the above description and accompanying figures are merely intended to illustrate the present invention by way of example only. The preferred embodiments of the present invention may thus vary within the scope of the attached claims.

CLAIMS

1. A method for generation and transmission of messages in a mobile telecommunication network,

comprising the steps of

monitoring (S1) the location of a mobile subscriber terminal (MS1, MS2) within cells (C0, ..., Cn) constituting the mobile telecommunications network (NW);

comparing (S2) the monitored location (C5) with a predetermined group of cells (C0, C2, C3, C4; C7, C8, C9);

judging (S3), whether the monitored location corresponds to said predetermined group of cells, and

if the result of judging is positive, sending (S4) a predetermined message from said network.

2. A method according to claim 1, wherein said message is sent to a predetermined subscriber terminal (SH1:PSTN, SH2:PSTN).

3. A method according to any of claims 1 to 2, wherein said message is a voice message.

4. A method according to any of claims 1 to 2, wherein said message is a data message.

5. A method according to claim 4, wherein said data message contains data for remotely controlling equipment assigned to said predetermined subscriber terminal (PSTN).

6. A method according to claim 4, wherein said data message contains instructions for transmission of data monitored at

equipment assigned to said predetermined subscriber terminal (**PSTN**), to said mobile subscriber terminal (**MS**).

7. A method according to claim 1, **wherein** said monitoring (**S1**) is effected by repeatedly retrieving data corresponding to the location of said mobile subscriber terminal (**MS**), from a home location register in which a record of the location of each subscriber terminal present within the range of an associated mobile services switching center is kept.

8. A method according to claim 1, **wherein** said predetermined message is transmitted only within a predetermined time range.

ABSTRACT

The present invention proposes a method for generation and transmission of messages in a mobile telecommunication network, comprising the steps of monitoring (S1) the location of a mobile subscriber terminal (MS1, MS2) within cells (C0, ..., Cn) constituting the mobile telecommunications network (NW); comparing (S2) the monitored location (C5) with a predetermined group of cells (C0, C2, C3, C4; C7, C8, C9); judging (S3), whether the monitored location corresponds to said predetermined group of cells, and if the result of judging is positive, sending (S4) a predetermined message from said network.

Fig. 2

FIG. 1

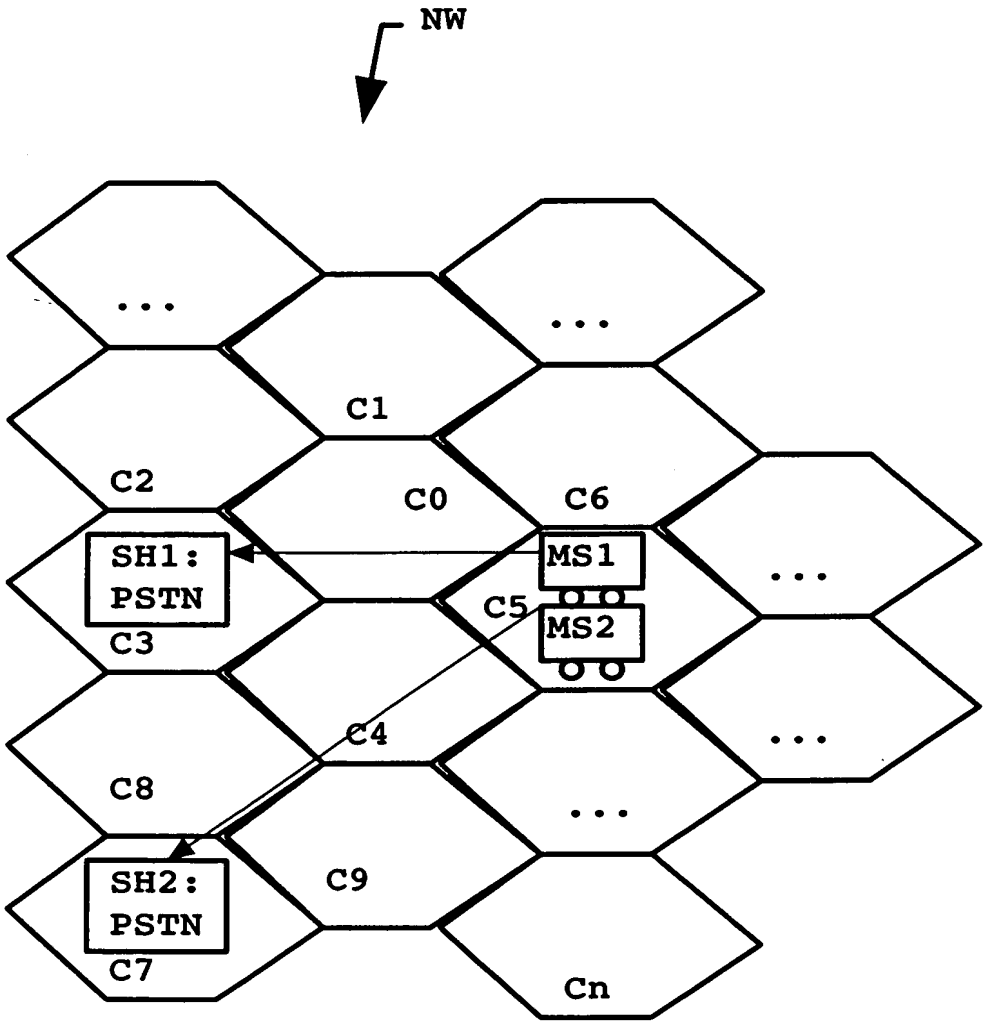
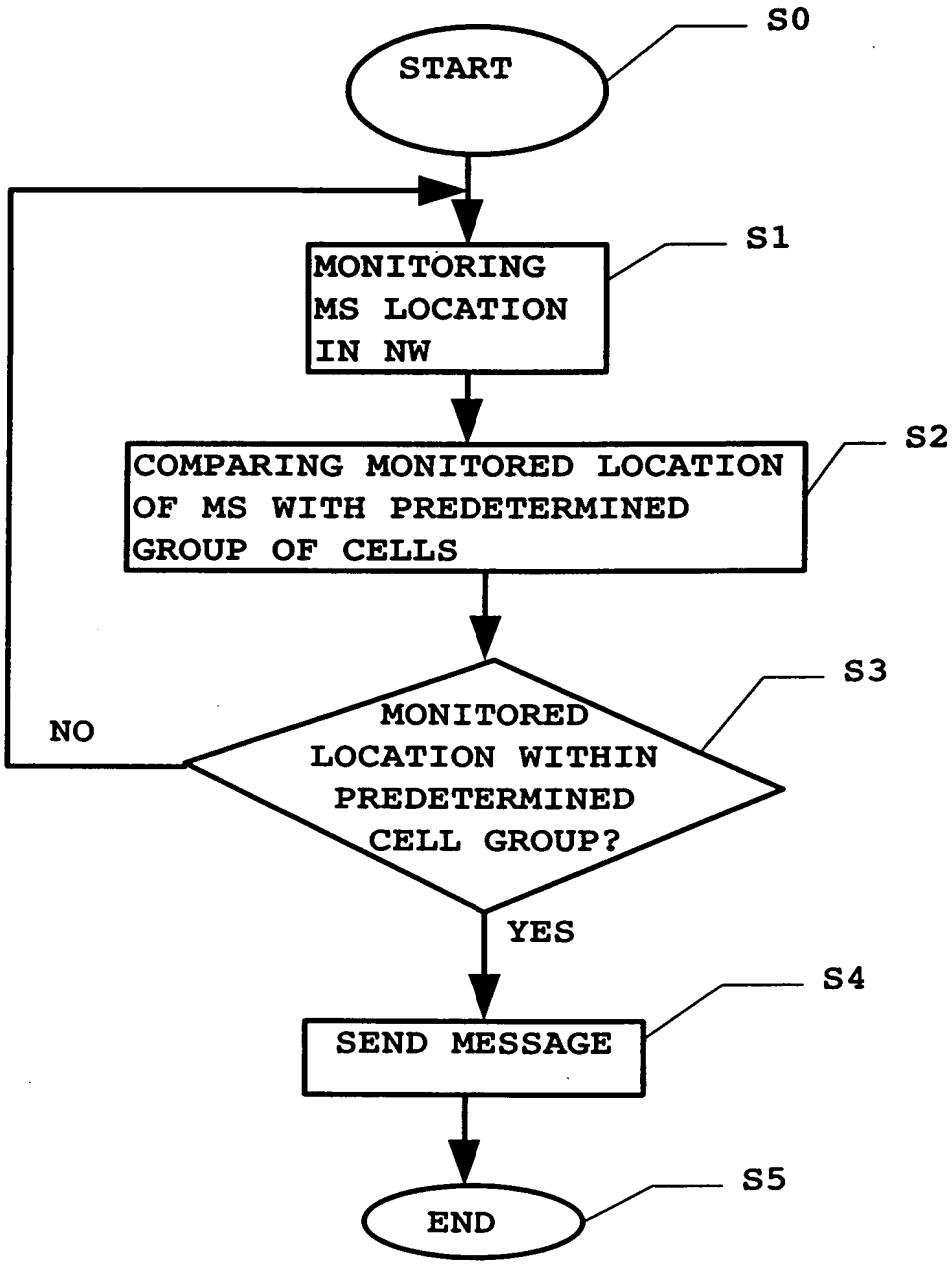


Fig. 2


S0
START
S1
MONITORING MS LOCATION IN NW
S2
COMPARING MONITORED LOCATION OF MS WITH PREDETERMINED GROUP OF CELLS
S3
MONITORED LOCATION WITHIN PREDETERMINED CELL GROUP?
NO
YES
S4
SEND MESSAGE
S5
END